CLAIMS

1. The composition for forming a transparent film, comprising photocatalytic particles; zirconium ammonium carbonate; a cohydrolysis-polycondensation product of an aluminum alkoxide represented by the formula $Al(OR)_3$ where R is an organic group and a titanium alkoxide represented by the formula $Ti(OR')_4$ where R' is an organic group; and water, and having a pH of 7 to 9.

2. The composition for forming a transparent film according to claim 1, wherein the composition is heated at 10 to 400°C for curing, thereby forming a transparent film.

3. The composition for forming a transparent film according to claim 1 or claim 2, which comprises the photocatalytic particles in an amount of 0.1 mass% to 5 mass%.

4. The composition for forming a transparent film according to any one of claim 1 to claim 3, which comprises zirconium ammonium carbonate in an amount of 0.1 mass% to 0.75 mass%.

5. The composition for forming a transparent film according to any one of claim 1 to claim 4, wherein the photocatalytic particles have an average particle size of 0.001 to 0.1 μm as calculated from the BET specific surface area.

6. The composition for forming a transparent film according to any one of claim 1 to claim 5, wherein the photocatalytic particles comprise at least one species selected from among titanium dioxide particles and titanium dioxide particles comprising phosphorus-containing compound on their surfaces.

7. The composition for forming a transparent film according to claim 6, wherein the titanium dioxide particles comprise a brookite-crystal phase.

8. The composition for forming a transparent film according to any one of claim 1 to claim 7, wherein the composition can be applied, without being repelled, to a

substrate exhibiting a contact angle with water of 50° or more.

9. The composition for forming a transparent film according to any one of claim 1 to claim 8, wherein the composition forms a coating film, having a hardness of 2H or more, after application onto a substrate and being allowed to stand at 10°C for 24 hours.

10. The composition for forming a transparent film according to any one of claim 1 to claim 9, which, after undergoing the steps of applying the composition to a substrate having an area of 400 cm^2 to a coating thickness of 200 nm, placing the substrate in a 5-L bag made of fluororesin, feeding into the bag air containing acetaldehyde at a concentration of 20 ppm by mass, sealing the bag; and irradiating the bag with light from a day white fluorescent lamp such that the intensity of 365 nm UV light is controlled to 6 $\mu W/cm^2$, exhibits a percent decomposition of acetaldehyde of 60% or more four hours after the start of irradiation.

11. The composition for forming a transparent film according to any one of claim 1 to claim 10, wherein, after the following steps: applying the composition to a substrate to a coating thickness of 200 nm and irradiating the coating film from the top thereof with light from a day white fluorescent lamp such that the intensity of 365 nm UV light is controlled to 6 $\mu W/cm^2$, the contact angle between the coating film and water is 10° or less, 24 hours after the start of irradiation.

12. A composition for forming a transparent film according to any one of claim 1 to claim 11, wherein, when the thickness of the film is 200 nm, the film has a total light transmittance of at least 95% and a haze of 1% or less.

13. The composition for forming a transparent film according to any one of claim 1 to 12, wherein the composition comprises the cohydrolysis-polycondensation

product of an aluminum alkoxide represented by the formula $Al(OR)_3$ and a titanium alkoxide represented by the formula $Ti(OR')_4$ in an amount of 0.1 mass% to 1 mass% as reduced to Al_2O_3 or in an amount of 0.01 mass% to 0.1 mass% as reduced to TiO_2

14. The composition for forming a transparent film according to any one of claim 1 to 13, wherein said cohydrolysis-polycondensation product of an aluminum alkoxide represented by the formula $Al(OR)_3$ and a titanium alkoxide represented by the formula $Ti(OR')_4$ has a particle size equivalent to or smaller than that of the photocatalytic particles.

15. The composition for forming a transparent film according to any one of claim 1 to 14, wherein a powder obtained by drying said cohydrolysis-polycondensation product of an aluminum alkoxide represented by the formula $Al(OR)_3$ and a titanium alkoxide represented by the formula $Ti(OR')_4$ has a specific surface area of $100m^2/g$ or more.

16. The composition for forming a transparent film according to any one of claim 1 to 15, further comprising a surface active agent.

17. The composition for forming a transparent film according to any one of claim 1 to 16, wherein the film obtained by coating and curing said composition on a substrate and having a thickness of 200 nm exhibits a yellowing degree of 10 or less, after the film is subjected to an acceleration-exposure test employing a xenon arc lamp for 4,000 hours, and exhibits a contact angle with water of 20° or less, after the irradiation of the film for 24 hours with light from a day white fluorescent lamp such that the intensity of 365 nm UV light is controlled to 6 $\mu W/cm^2$.

18. A method for producing a composition as recited in any one of claim 1 to 17 for forming a transparent film, the method comprising a step of adding a β-diketone

in an amount of 0.1 mol to 3 mol, an acid in an amount of 0.5 to 2 mol, and water in an amount of 1 to 20 mol to 1 mol of aluminum alkoxide represented by the formula $Al(OR)_3$ to form a solution; a step of adding a titanium alkoxide represented by the formula $Ti(OR')_4$ in an amount of 0.01 to 0.5 mol to the solution, while the mixture is heated at 40°C to 70°C, to form a composition comprising the cohydrolysis-polycondensation product of an aluminum alkoxide represented by the formula $Al(OR)_3$ and a titanium alkoxide represented by the formula $Ti(OR')_4$.

19. The method as claimed in claim 18, further comprising a step of adding photocatalytic particles to said composition comprising the cohydrolysis-polycondensation product of an aluminum alkoxide represented by the formula $Al(OR)_3$ and a titanium alkoxide represented by the formula $Ti(OR')_4$.

20. The method as claimed in claim 19, wherein the composition for forming a transparent film comprises a hydrophilic solvent in an amount of 10 % by mass or less.

21. A composition for forming a transparent film, which is produced through a method as recited in claim 17, claim 18 or claim 19.

22. A method for forming a transparent film, comprising coating and curing the composition for forming a transparent film as recited in any one of claim 1 to claim 17 and claim 21 on a substrate.

23. A material for an exterior wall of a building, a soundproof wall for a road, a windowpane of a building, a glass material for a showcase, a glass material for a fluorescent lamp, a guardrail, a filter for a deodorizing apparatus, a reactor for water treatment, an interior decoration tile, a water bath, or a shade for a lighting apparatus, to which a composition for forming a transparent film as recited in any one of claims 1 to 17 or in claim 21 has been applied.

24. An advertising signboard, a transparent soundproof wall for a road, a transparent resin building

material for exterior finishing, or a shade for a lighting apparatus, having a hard coating layer formed by applying a composition for forming a transparent film as recited in any one of claim 1 to claim 17 or in claim 21.